JPRS 68944

15 April 1977

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

GEOPHYSICS, ASTRONOMY AND SPACE

No. 395

20000215 064

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

USSR

EAST
EUROPE

NOTE

JPRS publications contain information primarily from foreign
newspapers, periodicals and books, but also from news agency
transmissions and broadcasts. Materials from foreign-language
sources are translated; those from English-language sources
are transcribed or reprinted, with the original phrasing and
other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets
[] are supplied by JPRS. Processing indicators such as [Text]
or [Excerpt] in the first line of each item, or following the
last line of a brief, indicate how the original information was
processed. Where no processing indicator is given, the infor-
mation was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are
enclosed in parentheses. Words or names preceded by a ques-
tion mark and enclosed in parentheses were not clear in the
original but have been supplied as appropriate in context.
Other unattributed parenthetical notes within the body of an
item originate with the source. Times within items are as
given by source.

The contents of this publication in no way represent the poli-
cies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical
Information Service, Springfield, Virginia 22151. In order-
ing, it is recommended that the JPRS number, title, date and
author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports
Announcements issued semi-monthly by the National Technical
Information Service, and are listed in the Monthly Catalog of
U.S. Government Publications issued by the Superintendent of
Documents, U.S. Government Printing Office, Washington, D.C.
20402.

Indexes to this report (by keyword, author, personal names,
title and series) are available through Bell & Howell, Old
Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement
may be addressed to Joint Publications Research Service,
1000 North Glebe Road, Arlington, Virginia 22201.

BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS 68944	2.	3. Recipient's Accession No.
4. Title and Subtitle USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS - GEOPHYSICS, ASTRONOMY AND SPACE, No. 395			5. Report Date 15 April 1977
			6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No.
			11. Contract/Grant No.
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered
			14.

15. Supplementary Notes

16. Abstracts

The report contains abstracts and news items on meteorology, oceanography, upper atmosphere and space research, astronomy and terrestrial physics, covering both science news and formal scientific reports. Published details of Soviet space spectaculars are included.

17. Key Words and Document Analysis. 17a. Descriptors

USSR
Geophysics
Astronomy
Astronautics
Meteorology
Oceanography

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group   3, 4A, 4B, 8, 22

18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22151	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 53
	20. Security Class (This Page) UNCLASSIFIED	22. Price A01

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

GEOPHYSICS, ASTRONOMY AND SPACE

No. 395

This serial publication contains abstracts of articles
from USSR and Eastern Europe scientific and technical
journals on the specific subjects reflected in the
table of contents.

Photoduplications of foreign-language sources may be
obtained from the Photoduplication Service, Library of
Congress, Washington, D. C. 20540. Requests should
provide adequate identification both as to the source
and the individual article(s) desired.

CONTENTS   PAGE

I. ASTRONOMY

News

REPORT ON LATEST EXPEDITION TO TUNGUSSKA "METEOR" SITE

[Article by Ye. Vostrukhov: "The Riddle of the 'Tungusska Wonder'"]

[Summary] Work has been completed on the processing of materials collected during the past summer by an expedition of Tomsk University, the All-Union Astrogeodetic Society and the Ukrainian Academy of Sciences in the region of the "Tungusska" fall of 1908. The field work in the taiga lasted for two months. A cosmochemical survey was made of soils and peat and a study was made of the effects of their magnetization as a result of explosion of the mysterious cosmic body. Particular attention was given to the epicenter of the event. The expedition was headed by Professor Nikolay Vladimirovich Vasil'yev. Although earlier expeditions found funnels in the taiga which presumably were formed by meteorite fragments, extensive excavations failed to support these suppositions and it has now been determined that these are simple karst formations, associated with permafrost. But the search continued for "meteor spherules," which should measure only several tens of microns in diameter. It was decided that the search would be more fruitful in peat bogs than in the forest soil, since the bogs receive mineral increments from the air only. The bogs were found to contain fused silicate particles up to 800 microns in diameter. A microchemical analysis revealed a set of elements atypical for classical meteorites -- an increased content of rare earth and heavy elements. [An increased content of rare earths was also found in forest zones.] Numerous samples of soil and peat were taken to ascertain their content of cosmogenic radiocarbon. A study of the samples at the Institute of Geochemistry and Physics of Minerals Ukrainian Academy of Sciences revealed that near the center of the catastrophe a considerable quantity of cosmogenic material fell in the form of silicate particles. The cosmic silicate particles usually are small: less than 200-300 microns. They are primary, of extraterrestrial origin. In addition, the peat was found to contain still another type of sharp-angled particles -- ferronickel.

It is now clear that the explosion was not caused by the explosion of a spaceship in the taiga, as postulated by some. The new data suggest that the Tungusska body was not a meteor, but a comet. Scientists for the first time have obtained a possibility for the direct analysis of the matter which makes up comets. This will yield highly valuable data not only on their chemical composition, but also will provide researchers with keys to an understanding of the history of evolution of the entire solar system. [336]

Abstracts of Scientific Articles

LOCAL SOURCES OF S-COMPONENT OF SOLAR RADIOEMISSION

[Article by B. I. Lubyshev, Siberian Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation, Siberian Department USSR Academy of Sciences, "Spectral Investigation of the Directivity of Emission of Local Sources of the S-Component of Solar Radioemission Using the Large Pulkovo Radiotelescope"]

[Abstract] Using the Large Pulkovo Radiotelescope, the author carried out a spectral investigation of the directivity of emission of four local sources of the S-component of solar radioemission at wavelengths of 3.2, 4.4, 6.6 and 9.0 cm with a resolution of 1'.1, 1'.5, 2'.2 and 3'.0, associated with unipolar spot groups of class H in the Waldmeier classification. It is shown that the dependence of the emission fluxes of local sources on the angular distance from the center of the solar disk has the nature of a cosine curve with a "truncated" peak. The "cutoff" level is dependent on the wavelength λ ; it increases with a decrease in λ . The directivity of the emission flux of the local source is dependent on the level of activity of the spot group with which it is associated. It was weaker for a local source associated with a more active group. The form of spectra with a sharply expressed peak at wavelengths 6-9 cm leads to the conclusion that gyroresonant radioemission in local sources is predominant to distances from the center of the solar disk attaining up to 80°.
[346]

INTERPRETATION OF WEAK ABSORPTION LINES IN VENUSIAN SPECTRUM

[Article by A. S. Anikonov, Astronomical Observatory of Leningrad State University, "Interpretation of Weak Absorption Lines in the Venusian Spectrum"]

3

[Abstract] The author has derived formulas for the equivalent width and profile of a weak line in the spectrum of the entire planet in dependence on phase angle. It is postulated that the planetary atmosphere consists of an optically thin layer above the clouds and a cloud layer of an infinitely great optical thickness. The scattering function for the cloud layer is assumed to be arbitrary. On the basis of computations of the reflection coefficient a study was made of the influence of the scattering function on the phase dependence of the equivalent width and profile of the weak line in the planetary spectrum. On the basis of a comparison of the theoretical and observed phase changes in the equivalent width of some weak absorption lines of carbon dioxide gas in the Venusian spectrum it was possible to estimate the number of CO_2 molecules in the layer above the clouds and their relative concentration in the cloud layer of Venus.
[346]

SEARCH FOR MONOPULSE SIGNALS FROM ASTRONOMICAL OBJECTS

[Article by N. S. Kardashev, V. A. Soglasnov, N. A. Savel'yeva, J. L. Steinberg, V. N. Sysoyev, M. V. Popov, N. Ya. Shapirovskaya, Ye. Ye. Spangenberg, I. Ye. Val'tts, V. I. Vasil'kov, L. M. Gindilis, V. I. Yeremeyev, V. V. Klimashin, A. S. Pshennikov, I. G. Reznikov, V. D. Sizova and A. A. Tatarinov, USSR Space Research Institute, Meudon Observatory, France, State Astronomical Institute and Moscow Power Institute, "Search for Monopulse Signals from Astronomical Objects"]

[Abstract] Simultaneous observations of radio signals from space were made at ground stations Pamirs-Caucasus (distance 3,000 km) and from the automatic interplanetary station "Mars-7" -- Kamchatka-Caucasus-Nancy (France) (distances up to 200 million, 8,000 and 1,900 km respectively) using multichannel radiometric apparatus in the range 30-550 MHz. The authors discuss their possible origin and the formulation of further experiments. The upper limit on the energy of an electromagnetic pulse possibly generated during the flaring of a supernova in a volume with a radius of 30 megaparsec is about $3 \cdot 10^{41}$ erg. The article also gives the limit on the frequency and energy of pulses emitted by other objects in the Galaxy and Metagalaxy.
[346]

II. METEOROLOGY

News

SOVIET METEOROLOGISTS TO STUDY MONSOON IN INDIAN OCEAN

Moscow PRAVDA in Russian 10 Mar 77 p 6

[Article by A. Androshin: "To the Secrets of the Monsoon"]

[Text] An international experiment called "Monsoon-77" will be carried out in the Indian Ocean this summer. A large number of Soviet meteorologists will participate in the experiment.

"Phenomena which occur over the ocean will have a noticeable effect on the earth's climate," says B. S. Chuchkalov, leader of the Soviet section of the international experiment and chief of the world weather section of the USSR Hydrometeorological Center. "The Indian Ocean is considered to be the 'cradle' of the southwest or, as they are still called, summer monsoons which are stable seasonal shifts of air near the earth's surface."

There they develop, enter the continent and begin their movement north. Their "breathing" shows up considerably in the development of meteorological processes and climate of the planet. For example, if we examine a synoptic map of the middle latitudes in which a considerable portion of the Soviet Union is located, it is here that we sometimes see the close connection between a change in weather and the movement of the southwest monsoons. In addition to this, the observations show that they also have an effect on the annual cycle of precipitation and this is especially important to agricultural specialists of the countries which are located in the area of the Indian Ocean. Therefore, the main purpose of these forthcoming operations is to search for reliable methods of long-range weather forecasting.

This will not be the first encounter between meteorologists of our country and the monsoons of South Asia. In 1973 in this same area there was a Soviet-Indian experiment which produced many interesting results. At the same time it also uncovered many problems requiring further study. Now a

new experiment is being started and this one is an international experiment. Eleven countries have expressed a desire to participate in it.

Our country will be sending five weather ships to the Indian Ocean. The flagship of the expedition "Akademik Shirshov" will leave Vladivostok for its four-month voyage at the beginning of May and it will be followed by the "Priliv," "Priboy," "Okean" and "Yu. M. Shokal'skiy."

Significant changes in the properties of the air masses, wind conditions, cloudiness and precipitation in the eastern part of the Arabian Sea are related to the beginning of the monsoon. Therefore, the expedition will conduct a study of the meteorological processes occurring in this region, including investigations of the boundary layer of the atmosphere which plays a large role in the air shifts near the earth's surface. In the western part of the Arabian Sea the "Yu. M. Shokal'skiy" will follow the behavior of the Somalian Current, which is very responsive to fluctuations in the monsoon winds which change the water temperature in the ocean near the shores of Africa. In the middle of July when the monsoon is at its peak, there is a change in the vortices which arise near the west coast of India and cause strong rains.

Information obtained from artificial earth satellites will aid the scientists. Equipment for receiving photographs is installed on board all of the ships for this purpose.

Radiosondes, meteorological rockets and balloons will be launched into the sky. An operations center called "Monsoon-77" in Bombay will coordinate the scientific work in the Indian Ocean. A computer on board the "Akademik Shirshov" will be used for preliminary analysis of the observations. [5]

Abstracts of Scientific Articles

CONDENSATION GROWTH OF CLOUD DROPLETS DURING TURBULENCE

[Article by V. M. Merkulovich and A. S. Stepanov, Institute of Experimental Meteorology, "Effects of Hygroscopicity and Surface Tension Forces in the Process of Condensation Growth of Cloud Droplets During Turbulence"]

[Abstract] In a diffusion approximation (the length of turbulent mixing is much less than the characteristic distance of change in the mean values) it was possible to obtain a closed system of equations for describing the state of the turbulent cloud medium in the variables: temperature, specific moisture content, droplet concentration, supersaturation of water vapor, salt content in cloud water and the cloud droplet size distribution function and the salt quantity distribution function. The authors analyze a case when the phase transitions transpire during the lifetime of the turbulent fluctuations. Proceeding on the basis of the derived equations, it was possible to estimate the increase in dispersion of the cloud spectrum of droplet sizes caused by: 1) the different salt content in the cloud droplets, 2) turbulent mixing in cases when the mean size of the cloud droplets (liquid water content) or the salt content in the cloud droplets are spatially inhomogeneous. The computations show that these effects exert a significant influence on the width of the cloud spectrum.
[351]

III. OCEANOGRAPHY

News

TASS ANNOUNCES LAST VOYAGE OF RESEARCH SHIP "VITYAZ'"

Moscow IZVESTIYA in Russian 8 Mar 77 p 2

[TASS Report: "Last Voyage"]

[Text] Vladivostok. The oldest research ship "Vityaz'" has departed from
Vladivostok on its 61st voyage. There are 14 laboratories and 60 research
workers on board the ship. The "Vityaz'" will sail across six seas and the
tropical part of the Indian Ocean. Together with the new scientific re-
search ship "Akvanavt," the "Vityaz'" will work in the Bay of Bengal and
the Red Sea and will conduct investigations in the Atlantic Ocean. Then the
veteran ship will be permanently anchored and will become an oceanographic
museum. [5]

COMMENTARY ON OCEANOGRAPHIC RESEARCH

Riga SOVETSKAYA LATVIYA in Russian 26 Feb 77 p 4

[Article by Oleg Spirin: "Penetrating the Secrets of the World Ocean"]

[Summary] The Polar Scientific Research Insitute of Fishing and Oceanography
is located in Murmansk. Almost a thousand workers are employed there. The
institute has well-equipped laboratories and 18 scientific research vessels.
The institute's director is Viktor Zlobin, a leading specialist in the study
of sea phytoplankton. The principal purpose of the institute is to find new
regions of commercial fishing and to predict the biological resources of
northern seas. It is necessary to know precisely the paths of fish migra-
tion and the reasons for an increase or decrease in the numbers of valuable
species. Krill is an example of a resource whose biomass in the ocean is
enormous. The "Okean" paste prepared from krill has already appeared in
shops and is in great demand. The institute works in close collaboration
with the socialist countries of East Europe. In the autumn of 1976, for

example, the institute's specialists, together with Polish scientists, carried out tests of instruments fabricated in East Germany in a laboratory on the shores of the White Sea. This year preparations are being made for a joint experiment for predicting the supplies of sprat in the Baltic Sea. Three vessels are participating: the Polish "Professor Lubetski," the "Ernest Heckel" of the German Democratic Republic and one from the institute. Soviet instrumentation will be used but the method has been developed by all. In addition to the Murmansk institute, there are four similar institutes in the country. Scientists are being assisted not only by scientific research ships, but also by artificial earth satellites and orbital stations... In 1973 an international experiment was carried out with a satellite. While an American satellite made a survey from space, observing the Newfoundland Banks, the Soviet scientific research vessel "Persey-III" carried out studies on the sea surface. The crews on the "Salyut-4" orbital station also carried out missions of the Ministry of Fisheries.
[325]

Abstracts of Scientific Articles

VERTICAL STRUCTURE OF BAROCLINIC LAYER

[Text] On the basis of data for weather ship E (φ = 35°N, λ = 48°W) the
authors analyzed the intraannual variability of the vertical distribution
of hydrological characteristics. The observed variability is explained us-
ing a theoretical model of nonstationary circulation in a baroclinic ocean.
The intraannual variability of the vertical structure of waters in the sub-
troposphere is manifested for the most part in a change in the thickness
of the quasihomogeneous layer, bounded above by the 18° isotherm. The low-
er-lying layers, not changing in structure, experience only a depth dis-
placement attaining 300 m. At depths of 500-800 m, due to a change in the
depth of layers with constant gradients, there is an intraannual regular
variability of the hydrological fields. There is no synchronism in the in-
traannual changes in the considered fields in the upper (0.250 m) and lower
(250-1,300 m) layers. The temperature at the depths of the lower boundary
of the main thermocline can serve as an indicator of the vorticity of the
above-lying layers. Its minimum values correspond to cyclonic vorticity
and the maximum values to anticyclonic vorticity. The nature of vorticity
of waters of the main thermocline exerts an influence on the characteris-
tics of the upper active layer of the ocean. Against a background of sea-
sonal variability there is an increase in its thickness in the case of an
anticyclonic vorticity of the above-lying waters and a decrease in the case
of cyclonic activity.
[276]

LECTURES ON WAVES IN THE OCEAN

[Abstract of article by L. M. Brekhovskikh, V. V. Goncharov, K. A. Naugol'-
nykh and S. A. Rybak; Gor'kiy, IZV. VYSSH. UCHEB. ZAVEDENIY. RADIOFIZIKA,
19, No 5-6, 1976, pp 842-863, "Waves in the Ocean"]

[Text] This is the content of three lectures presented at the Third Scien-
tific School on Nonlinear Oscillations and Waves in Distributed Systems
(Gor'kiy, 1975). The first lecture examines the linear theory of waves in
the ocean. It gives the derivation of equations describing movements, per-
iodic in time and horizontal coordinates, on a rotating earth. The Boussin-
esq approximation is used. Among the presented equations, as special cases
the authors examine acoustic waves, surface gravitational, internal and in-
ertial, gravitational-gyroscopic and Rossby waves. The second lecture ex-
amines multiwave interactions in the ocean, in particular, three-wave in-
teractions. An analysis was made of the spectral representation of the
equations for a case when at the initial moment the spectrum is discrete.
The lectures give the results of computations of the interaction and redis-
tribution of energy within the resonance triad. There is an analysis of
processes of multiwave interaction using a model one-dimensional nonlinear
equation with dispersion and also the interaction of wave packets. The
third lecture examines the problems involved in the interaction between
a plane regular wave of finite amplitude and noise. Bibliography of 16
items.
[276]

DIGITAL INSTRUMENT FOR MEASURING PARAMETERS OF SEA CURRENTS

[Abstract of article by A. N. Paramonov, V. M. Kushnir, S. I. Golovin and
M. V. Ivanchik; Sevastopol', MOR. GIDROFIZ. ISSLED., No 2(73), 1976, pp
61-67, "Distinguishing Variations in the Characteristics of the Sea Surface
and the Atmosphere on the Basis of Thermal Radioemission Measured from a
Satellite"]

[Text] The article describes a method for checking the nondegeneracy
of the Jacobi matrix of radiobrightness temperature remotely measured from
an artificial earth satellite. The authors use the procedure of evaluating
the linear functional dependence between several variables in the sample
of measurements at a number of points. The admissibility of the linear ap-
proximation of the investigated dependence for real variations of water

temperature in the ocean, the parameters of cloud cover and water vapor in the atmosphere follows from a special numerical analysis carried out by the authors. An important peculiarity of the method is the possibility of an interpretation of observations without use of the laws of formation of radiation. However, it is necessary that the errors in observations be independent and have a normal distribution identical for all measurements. After analyzing the data obtained from the AES "Kosmos-243," in a specific example the authors demonstrate the possibilities of the method and show the validity of the assumptions made. Bibliography of seven items.
[276]

STRUCTURE OF THE UPPER LAYER OF THE OCEAN

[Article by B. V. Khar'kov, Institute of Oceanology, "Structure of the Upper Layer of the Ocean"]

[Abstract] The author proposes parameterization of the structure of the upper layer of the ocean, including the upper homogeneous layer and the layer of the seasonal thermocline. As a result of study of data from laboratory experiments and observations of the temperature field in the ocean it was possible to propose a relationship between the thickness h of the homogeneous layer and the thickness of the thermocline H-h in the process of their seasonal changes. Numerical solutions have been obtained for a system of equations modeling the seasonal changes in temperature, the homogeneous layer T_S, its depths h, temperature drop $T_S - T_0$ in the seasonal thermocline, its thickness H - h and heat fluxes at the boundaries of these regions. Experimental data are compared with computations.
[366]

STATIONARY CURRENTS IN THE EASTERN MEDITERRANEAN SEA

[Article by T. Z. Dzhioyev and V. N. Drozdov, Institute of Oceanology, "Computation of Stationary Currents in the Eastern Mediterranean Sea"]

[Abstract] On the basis of the Sarkisyan theoretical model the authors carried out computations of the level surface and current velocities on the basis of the known density field and atmospheric pressure at sea level in the eastern Mediterranean. It is shown in the text and in a series of maps that the general circulation of waters in this area is caused for the most part by density gradients and has primarily a cyclonic nature. The contribution of the purely drift component amounts to as much as 30% of the surface

velocity and decreases rapidly with depth. The presence of individual clear-
ly expressed circulations is a characteristic peculiarity of circulation in
this part of the sea. A further decrease in the interval of the difference
grid will possibly make it possible to ascertain the characteristics of
circulation at a finer scale. In the investigated basin there is no deep
countercurrent: the direction of the currents at depth coincides well with
the direction of the surface currents.
[366]

MODELS OF NONSTATIONARY LARGE-SCALE OCEANOLOGICAL PROCESSES

[Article by R. G. Grigorkina and Yu. A. Chistyakov, Leningrad State Univer-
sity, "Very Simple Phenomenological Models of Nonstationary Large-Scale
Oceanological Processes. II"]

[Abstract] This is the second part of this study [see VESTN. LENINGR. UN-TA,
No 24, 1975, pp 97-109]. In this paper the authors propose a multiplicative
model with an external effect in the form of modulation for describing non-
stationary properties of oceanological processes. Analytical expressions
are derived for evaluating the moment functions of modifications of this
model: amplitude and amplitude-phase modulation with additive uncorrelat-
ed "red" noise. A study is made of the peculiarities of behavior of the
evaluations of the moment functions of models in time and in cross-section.
A comparison of the statistics of models and real processes in the ocean
revealed that on the basis of the proposed models it is possible to describe
both diverse oceanological and meteorological processes.
[333]

IV. TERRESTRIAL GEOPHYSICS

News

TASS REPORTS CONDITION OF RUMANIA AND BULGARIA AFTER EARTHQUAKE

Moscow PRAVDA in Russian 7 Mar 77 p 3

[TASS Report: "After the Earthquake"]

[Text] Bucharest, 6 March. According to preliminary data published here, during the earthquake in the capital of Rumania 508 people were killed and 2,600 were injured. In other regions of the country the number of people killed reached 72 and the number of injured was 614. Rescue operations are continuing.

According to a report by the Agerpres agency, the earthquake caused great material damage to the economy of the country. Several industrial enterprises and institutions temporarily stopped operation and in a number of populated areas the water supply systems and power transmission lines were damaged.

In Bucharest, the capital of the country, the removal of the aftereffects of the earthquake continued. Special commissions are checking the condition of damaged buildings and are taking measures to evacuate families who are in danger. Those left without shelter are being placed in hostels and new residential buildings which will serve as temporary housing.

The patriotic work of thousands and thousands of people and specific energetic measures have made it possible to almost completely restore the supply of water, electric power and gas to the population and industrial enterprises of the capital.

Gradually the industrial enterprises, power plants and other institutions which suffered damage and destruction are resuming their normal operation.

The adopted plan to provide the capital's population with food is being efficiently carried out and the food supply in regions which were victims of the earthquake is constantly being watched.

The Executive Political Committee of the Central Committee of the Rumanian Communist Party has held a meeting and has outlined measures for the fastest restoration of normal social and economic activity of the affected areas.

<div align="center">***</div>

Sofia, 6 March. According to preliminary information published here, 20 people died and 165 people were injured in Bulgaria as a result of an earthquake. The strongest earthquake tremors were felt in cities on the Danube such as Svishtov, Ruse and others.

Immediately after the earthquake rescue operations were started in which army divisions and the population are taking part. Medical help is being offered to the earthquake victims and they are being provided with food, clothing and shelter. A government committee headed by Deputy Chairman of the Council of Ministers of the People's Republic of Bulgaria S. Dylbokov has been designated to offer aid to regions in which the earthquake occurred. The Council of Ministers of the People's Republic of Bulgaria has accepted the decision to offer aid to the victims and has outlined a number of measures to rectify the damage done to the national economy as a result of the earthquake. [5]

ROMANIAN EARTHQUAKE FELT IN LATVIA

Riga SOVETSKAYA LATVIYA in Russian 6 Mar 77 p 4

[Unsigned article: "There is No Cause for Concern"]

[Excerpt] Yesterday in our editorial offices and in the various departments of the Administration of the Hydrometeorological Service Latvian SSR the telephones rang constantly. There was one question: what happened on 4 March between ten o'clock and eleven o'clock in the evening? An earthquake? This question was asked most often by people who live on the upper floors of buildings in Riga but there were also calls from Rezekne and Daugavpils. They said that they felt clearly perceptible tremors in their apartments. Somewhere a couch moved, chandeliers swung, and dishes rattled.

Since these natural phenomena are not characteristic of Latvia, there is no organization which would study them. Therefore, for an explanation one must turn to hydrometeorologists who are the closest in profession to geophysicists. They confirmed the fact that on 4 March in the territory of

Latvia the earthquake most probably registered force 3-4. If this is
checked on the 12-unit scale used in the USSR, force 3-4 is distinguished
by a slight vibration of objects, by the ringing of dishes and window glass,
and by the creak of doors and walls -- nothing more. This "behavior" of ob-
jects was also noted by the inhabitants of Riga and other cities in the
republic. Hydrometeorologists explained that such weak earthquakes occur
in the Baltic area approximately once every 50 years.

The deputy director of the USSR Academy of Sciences Institute of Phys-
ics of the Earth, professor and honored scientist of the RSFSR Ye. S. Boris-
evich made things clear by saying that in Riga the weak tremors could have
reached force 3-4 and that they do not present any danger. [5]

Abstracts of Scientific Articles

QUARTZ CHRONOMETER PATENTED

[Abstract of patent by V. K. Smirnov and A. M. Starostin; Moscow, Author's Certificate USSR, No 487372, published 3 February 1976, "Quartz Chronometer"]

[Text] The authors propose a quartz chronometer with a phasable time scale for operation under field conditions. The patent describes the structure and operating principle for an electronic circuit proposed by the authors for the purpose of increasing the accuracy in determining chronometer correction using precise time radio signals (phasing accuracy).
[331]

STABILITY OF LEVELING MARKS

[Abstract of article by T. V. Rad'o; --, GEOD., KARTOGR. I AEROFOTOS"YEMKA. RESP. MEZHVED. NAUCH.-TEKHN. SB., No 24, 1976, pp 103-107, "On the Problem of the Stability of Leveling Marks Used in Study of Recent Vertical Movements of the Earth's Crust"]

[Text] By means of dispersion analysis the author investigated the stability of 468 leveling marks in mountainous regions of the Carpathians and Caucasus used for study of movements of the earth's crust. It is shown that the most stable marks were those embedded in engineering structures. In particular, as a result of neotectonic factors water tanks are displaced by an average of 0.5 mm/year; other structures situated in the railroad zone (barracks, railroad stations, sentry boxes, bridge abutments, etc.)

were displaced by 1.0-1.5 mm/year or more. The author proposes a formula for
taking into account the change in elevation of the initial marks and towers
for the purpose of reducing these elevations to the epoch in which leveling
work was carried out.
[331]

RECENT CRUSTAL MOVEMENTS IN ESTONIA

[Abstract of article by Kh. Sil'dvee and A. Miydel; Tallin, TEZISY DOKL.
RESP. NAUCH.-TEKHN. KONF. PO AVTOMOB. DOROGAM I GEODEZII, 1976, pp 89-90,
"Results of Interpretation of Recent Crustal Movements in Estonia"]

[Text] The authors carried out a comparison of models of recent vertical
movements obtained on the basis of the results of recent levelings and
models of the surface of the basement, gravity and magnetic fields. No
clear correlation between them was discovered. The general model of recent
movements also does not agree with the large-block structure of the base-
ment. At the same time it is noted that recent movements in general inherit
the nature of late- and post-glacial uplifting, which is indicative of a
substantial influence of the glacioisostatic factor in the regional plan.
[331]

METHOD FOR CORRECTION OF TRIANGULATION NETWORK

[Abstract of article by T. Dambara; Tashkent, POISKI PREDVESTNIKOV ZEMLE-
TRYASENIY, "Fan," 1976, pp 112-114, "Correction of Triangulation Network
by the Method of Matching Towers and Horizontal Movement in the Tann Re-
gion"]

[Text] A study was made of horizontal movements of the earth's crust along
a fault in the Tann region (Japan) over a 40-year period. The investiga-
tions were made by constructing repeated triangulation and a survey of the
terrain using measurements of distances with electronic rangefinders. Also
given is a formula for determining the time of preparation of a future
earthquake.
[331]

CHOICE OF SPECTRAL ZONES FOR MULTIZONAL SPACE SURVEY

[Abstract of article by V. A. Kottsov, Yu. I. Fivenskiy and Yu. M. Chesnokov; Moscow, MNOGOZONAL'N. AEROKOSMICH. S"YEMKA I YEYE ISPOL'Z. PRI IZUCH. PRIRODN. RESURSOV, Moscow University, 1976, pp 15-24, "Substantiating the Choice of Spectral Zones for a Multizonal Space Survey"]

[Text] This is a study of the principles of optimization for the receiving part of a system for a multizonal survey using the criterion of the best distinguishability of the registered objects. The system is represented by a system of the perceptron type; for selecting the spectral survey channels it is possible to use the signatures of contrasts of the spectral characteristics of objects.
[331]

USE OF PHOTOGRAMMETRY IN PHOTOGRAPHIC ASTROMETRY

[Abstract of article by Stoyan Dzhudzhev; Sofia, GEOD., KARTOGR., ZEMEUSTR., 16, No 1, 1976, pp 27-30, "Use of Photogrammetry in Photographic Astrometry"]

[Text] The components of the direction vector of a satellite in a sidereal coordinate system at a particular moment in time can be determined analytically by both astronomical and photogrammetric methods. On the basis of writing of analytical expressions for the direction vector of a satellite in equatorial and local coordinate systems it is possible to derive formulas for relating the coordinates of an object and its photographic image, similar to classical photogrammetric formulas. By means of their differentiation it is possible to ascertain the corrections to the elements of inner (coordinates of the optical center, focal length of the satellite camera) and outer orientation, which makes it possible to increase the accuracy of photographic satellite observations. Tables give digital results obtained with a digital computer using the cited formulas. Bibliography of five items.
[331]

HARMONIC ANALYSIS OF GRAVITY ANOMALIES

[Abstract of article by V. V. Buzuk and I. G. Vovk; Novosibirsk, O GARMON-
ICHESKOM ANALIZE ANOMALIY SILY TYAZHESTI (Harmonic Analysis of Gravity
Anomalies), Novosibirsk Institute of Geodetic, Aerial Mapping and Carto-
graphic Engineers, 1976, 6 pages [Manuscript deposited at the All-Union In-
stitute of Scientific and Technical Information, 6 July 1976, No 2567-76
DEP]]

[Text] A method is proposed for the harmonic analysis of gravity anomalies
making it possible to divide the investigation of the complex spectrum of
measured $\Delta g(\varphi, \lambda)$ values into three parts in dependence on the degree
of study of the earth's surface. It was possible to determine the short-
period harmonics of gravity on the basis of the results of harmonic anal-
ysis for a limited part of a sphere. Equations were derived relating the
coefficients for these harmonics and the coefficients of expansion of grav-
ity anomalies in spherical functions on a limited part of a sphere.
[331]

CALIBRATION OF SEA GRAVIMETERS BY TILTS METHOD

[Abstract of article by K. Ya. Koz'yakova and T. P. Shchegol'kova; Moscow,
REZUL'TATY ISSLED. PO ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp
27-41, "Calibration of Automated Sea Gravimeters (AMG) by the Tilts Method"]

[Text] The article gives a brief description of the principle and method
for calibrating automated sea gravimeters (AMG) by the tilts method. The
author describes in detail the UEG-2 apparatus developed and fabricated
at the Institute of Physics of the Earth USSR Academy of Sciences used
for their calibration. The article gives its technical specifications and
describes the design, assembly and adjustment of the apparatus. Adjust-
ments of the investigated gravimeter on this apparatus are considered in
detail. Bibliography of 14 items.
[331]

DEPENDENCE OF GRAVIMETER GRADUATION ON INSTRUMENT ORIENTATION

[Abstract of article by R. B. Rukavishnikov; Moscow, REZUL'TATY ISSLED. PO ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp 60-62, "Dependence of Gravimeter Graduation on Instrument Orientation Relative to the Axis of Rotation of the UEG Tilting Platform During Calibration by the Tilting Method"]

[Text] The dependence was determined using a thermostated quartz astaticized VIRG 61 No 8 gravimeter in the range -7 – +7° with rotation of the investigated gravimeter in "azimuth." It was established that the graduation of the investigated gravimeter is not dependent within the limits of the accuracy in its determination ($M_C/C = \pm 0.5 \times 10^{-4}$) on its orientation on the UEG relative to the axis of rotation of the tilting platform during rotation in azimuth from a strictly regulated position up to $\pm 7°$. Bibliography of seven items.
[331]

DEPENDENCE OF GRAVIMETER GRADUATION ON INTERNAL AND EXTERNAL TEMPERATURES

[Abstract of article by K. Ya. Koz'yakova and Z. P. Svetlosanova; Moscow, REZUL'TATY ISSLED. PO ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp 48-54, "Investigation of the Dependence of the Graduation of Automated Sea Gravimeters on Thermostated Temperature and External Temperature"]

[Text] The authors have obtained the residual temperature coefficient of elastic systems of AMG automated sea gravimeters; it averages 10 mgal/degree. It was established that a change in thermostated temperature by approximately 10° introduces into the results of measurements by AMG gravimeters errors of about $2-3 \cdot 10^{-3}$ of the measured Δ g. A change in ambient temperature exerts an influence on the gravimeter graduation of less than $0.5-1.0 \cdot 10^{-3}$, but influences the gravimeter reading. As a result of the inadequate amount of experimental data, the nature of this dependence has not been finally clarified. It is postulated that this change in the gravimeter reading is caused by the influence of changes in ambient temperature on the AMG recording device. Bibliography of 24 items.
[331]

CALIBRATION OF GAK 7Sh WIDE-RANGE GRAVIMETER

[Abstract of article by R. B. Rukavishnikov; Moscow, REZUL'TATY ISSLED. PO ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp 63-65, "Calibration of the GAK 7Sh Wide-Range Gravimeter by the Tilts Method"]

[Text] An investigation of the reading scale of the GAK 7Sh quartz astatic-ized wide-range gravimeter was made in the range of 1-20 turns with interro-gation each turn. With representation of the reading scale by a first-degree equation the correction for nonlinearity attains approximately 1.3 mgal. It was established that by the tilts method it is possible to determine the the graduation of wide-range gravimeters with a high accuracy ($M_C/C = \pm 1-2 \cdot 10^{-4}$, $M_{f(N)} = \pm 0.05$ mgal) at low cost. Bibliography of five items.
[331]

RESULTS OF CALIBRATION OF AMG GRAVIMETERS

[Abstract of article by K. Ya. Koz'yakova and V. I. Korenfel'd; Moscow, REZUL'TATY ISSLED. PO ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp 42-47, "Results of Calibration of AMG Gravimeters"]

[Text] This paper gives the results of a comparison of calibration of AMG sea automated gravimeters by different methods: the tilts method and using points in a standard polygon in a range of approximately 2.5 Gal. The ob-servational data were processed on a digital computer. It was established that with an internal error in determining the coefficients of the gradua-tion by the tilts method of $\pm 5 \cdot 10^{-4}$ there are systematic discrepancies of about $2.7 \cdot 10^{-3}$ between determinations by the tilts method and in a standard polygon. In order to achieve a relative error in determining the graduation of about $\pm 5 \cdot 10^{-4}$ it is necessary to improve the method of regulating the UEG apparatus and the gravimeters investigated on it and also the method for calibration, by the tilts method, of two-system gravimeters with a single-channel registry system. Bibliography of seven items.
[331]

"MAGNITUDE" AS USED IN SOVIET SEISMOLOGY

[Article by I. V. Gorbunova and N. V. Kondorskaya, Institute of Physics of the Earth, "Magnitude in Seismological Practice in the USSR"]

[Abstract] The paper gives the magnitudes M_L and m_{PV}, determined on the basis of data from the Integrated Seismological Observation Service. It is shown that the magnitudes M_L are determined more precisely from the vertical component and have a good similarity when using different types of apparatus of classes B and C. The calibration curve for determining magnitude M_L requires refinement in the near zone. The magnitude m, determined on the basis of body waves, is dependent on the period of the P wave and accordingly, on the apparatus registering these waves. The maximum A/T values in the P wave fall in the range of periods 2-8 sec, which corresponds to the passband of class-C instruments. The calibration curves constructed using apparatus registering intermediate periods are unsuitable for determining magnitude from records registered with short- and long-period instruments.
[352]

INSTRUMENTATION FOR MEASURING PARAMETERS OF WEAK MAGNETIC FIELDS

[Abstract of article by V. I. Bryakin and A. M. Skrynnikov; Frunze, METODY I SREDSTVA AVTOMATIZ. NAUCH. EKSPERIMENTA, "Ilim," 1976, pp 16-24, "Instrument for Measuring Parameters of Weak Magnetic Fields"]

[Text] The article presents the program and results of laboratory tests of a model of an instrument for measuring weak electromagnetic fields. The model contains input converters for the magnetic component of the natural electromagnetic field and a measuring device. The input converter for the field is a multiturn coil (1,500 turns of PETV-0.2 wire) with a core of material with a high magnetic permeability (ferrite rod 300 mm long, fabricated from rings NM 28 x 16 x 9, μ = 3000) and has a high internal resistance. For matching such current collectors with the measuring device there is a matching stage prepared using a K2SS842A microcircuit and having a low level of intrinsic noise, a linear amplitude-frequency curve and an increased stability of operation in the case of sign-variable input signals whose amplitude changes in a wide range. The measuring device of the model contains two measuring channels with frequencies of 175 and 480 Hz, the selection of which is dictated by the necessity of cutting out the harmonics of industrial interference. The total error of the model when measuring

the angle of inclination of the greater axis of the magnetic field polariz-
ation ellipse to the horizon is 2-3%, which makes possible a reliable de-
tection of field anomalies constituting 5-6% of the total background. Bib-
liography of five items.
[276]

DIGITAL METHODS FOR PROCESSING MULTIZONAL PHOTOGRAPHS

[Abstract of article by I. K. Lur'ye and A. P. Tishchenko; Moscow, MNOGO-
ZONAL'N. AEROKOSMICH. S"YEMKA I YEYE ISPOL'Z. PRI IZUCH. PRIROD. RESURSOV,
Moscow University, 1976, pp 122-130, "Digital Methods for Processing Multi-
zonal Photographs in a Study of the Earth's Natural Resources"]

[Text] The digital processing of multizonal space information includes two
principal stages: correction of images and identification. In order to
suppress the noise superposed on the image the authors recommend the op-
eration of filtering by image smoothing. The fundamental mathematical prob-
lems in numerical interpretation are the discrimination of homogeneous sub-
sets in the image and their identification by a comparison with standard
brightnesses in individual spectral zones. The conclusion is drawn that
the determined brightnesses must be scaled into more informative character-
istics of natural features (for example, into spectral albedos). In order
to evaluate the information content of the contribution of different spec-
tral zones and increasing interpretation reliability it is necessary to
subtract the images obtained in different zones and therefore the choice
of the working survey zones of the spectrum requires special investigation.
[331]

MODELING STRUCTURES OF CRUST AND UPPER MANTLE

[Abstract of article by S. S. Krasovskiy; Sevastopol', KOMPLEKS. GEOFIZ.
ISSLED. SREDINNO-ATLANTICH. KHREBTA, 1975, pp 176-182, "Method for Model-
ing Structures of the Earth's Crust and Upper Mantle in the Gravity Field"]

[Text] In order to improve the correspondence between gravimetric models
and experimental data and materials from deep seismic sounding (DSS) the
author postulates a gradient increase in density with depth with a density
drop at the Conrad discontinuity of 0 or 0.1 g/cm^3 and at the Moho -- 0.2
g/cm^3. Below the Moho there may be density inhomogeneities of not more than

±0.1 g/cm^3. The methodological basis of modeling as a method for interpreting gravity anomalies, carried out by successive approximations using the system "Man — Electronic Computer," is a determination of the gravitational effect separately from different structural stages and individual structures with a subsequent analysis of their influence on the total field. The discrepancies between the determined total field, corresponding to the selected model, and the observed anomalies are used for improving the model. Gravity anomalies can be used in both the Bouguer and in the Faye reductions. It is noted, in particular, that investigations of ocean regions must be carried out in a three-dimensional variant. The influence of three-dimensionality is great for depths of the sea floor exceeding 1 km. Bibliography of eight items.
[331]

COMPUTING DENSITY OF SEA FLOOR

[Text] On the basis of data on the topography of the sea floor and gravimetric measurements an attempt was made to determine the density of the upper layer of the bottom using an electronic computer. A mandatory condition for solving the problem is the presence of relief irregularities which are reflected in the gravity field. In the case of properly determined density the influence of relief irregularities in the residual field is excluded and the latter becomes smoother. There is difficulty in solving the problem associated with a possible correlation between relief irregularities and the gravitational influence of deep sources. A special filter is selected for excluding it. If the relief irregularities are small in comparison with the thickness of the layer, a spurious solution may be obtained in which the gravitational influence caused by deep sources is not discriminated in the residual field but is interpreted as the variable density of the upper layer. In order to exclude such solutions the authors introduce the additional condition of the minimum of the correlation between variations of the sought-for density and the initial gravity field. Several profiles in the Indian Ocean were used in the interpretation. The points of observed gravity with an accuracy of about 3 mgal were situated each 5 miles and relief points were given with the same density. The computed variable density extended to a layer with a thickness of 4.5 km, bounded below by a horizontal plane. The thickness of the layer was selected in such a way that the density variations in the layer had an amplitude agreeing with data on the petrographic composition of the rocks. It was

established from computations that the ridges are related to transition
zones between ocean regions with different deep tectonic structure and
that gravitational inhomogeneities are situated in a layer with the thick-
ness adopted in the computations. The mean densities were computed for each
profile.
[331]

MISALIGNMENT OF QUARTZ SYSTEMS IN SEA GRAVIMETERS

Moscow REFERATIVNYY ZHURNAL 52. GEODEZIYA I AEROS"YEMKA, OTDEL'NYY VYPUSK
in Russian No 11, 1976 11.52.120

[Abstract of article by K. Ya. Koz'yakova; Moscow, REZUL'TATY ISSLED. PO
ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp 66-68, "Misalignment
of Quartz Systems in AMG Sea Gravimeters"]

[Text] The paper gives the results of determinations of the angles of mis-
alignment of the quartz systems in automated sea gravimeters, type AMG,
Nos 3 and 4. The author gives a brief description of the method for making
these determinations. It was established that the angles of misalignment
fall in the range from several minutes of angle to several degrees. It is
postulated that this can explain the difference in the signs of the sys-
tematic errors arising in a comparison of two methods for the calibration
of AMG gravimeters.
[331]

TEMPERATURE DEPENDENCE OF GRADUATION OF CG-2 GRAVIMETERS

Moscow REFERATIVNYY ZHURNAL 52. GEODEZIYA I AEROS"YEMKA, OTDEL'NYY VYPUSK
in Russian No 11, 1976 11.52.119

[Abstract of article by K. Ya. Koz'yakova and R. B. Rukavishnikov; Moscow,
REZUL'TATY ISSLED. PO ETALONIROVANIYU GRAVIMETROV, "Sov. Radio," 1976, pp
12-20, "Nonlinearity of the Temperature Dependence of the Graduation for
the CG-2 (Sharp) Gravimeter"]

[Text] The paper cited above gives the results of investigations of the
temperature dependence of the graduation for the fine and coarse ranges of
quartz astaticized gravimeters. The calibration was carried out in static
temperature regimes by the tilts method in the temperature range from 0
to +35°. It was established that the changes in the graduation with a tem-
perature change by 1° fall in the range from 0.1 to $1.5 \cdot 10^{-4}$; for one and
the same instrument there is a different dependence for the fine- and
coarse-range screws. The square corrections for nonlinearity of the tem-
perature dependence of a graduation for individual instruments (for screws
in both ranges) were $1.5-2.2 \cdot 10^{-4}$. Bibliography of 33 items.
[331]

CRUSTAL DENSITY INVERSIONS IN FAR EAST

[Article by Academician Yu. A. Kosygin, Yu. F. Malyshev, L. M. Parfenov and N. P. Romanovskiy, Institute of Tectonics and Geophysics, Far Eastern Scientific Center, "Density Inversions in the Earth's Crust in the Southern Far East"]

[Abstract] The authors have compiled a map of density of rocks in the Far East which differs significantly from those published earlier. The results of a geological-statistical grouping of density determinations of 138,000 samples were reduced to the centers of grid units measuring 30' in longitude and 20' in latitude. The entire area was divided into 786 such grid units. The mean density of the rocks in these grid areas varies from 2.40 to 2.83 g/cm^3. Comparison of this map with gravimetric and geological maps made possible an approach to a three-dimensional study of the distribution of density inhomogeneities in the earth's crust. The principal pattern which was established in a comparison of gravitational anomalies (Fig. 2) with the density map (Fig. 1) is the existence of a density inversion. The discovery of a correlation between gravity anomalies and density inhomogeneities of the earth's crust in the southern part of the Far East leads to the conclusion that the reaching of rocks of a definite density, averaged for blocks of different size at the surface, within the limits of a particular region is not random, but is associated with the peculiarities of their deep structure. The direct correlation between density and gravity anomalies for local surface inhomogeneities of the earth's crust and the inverse correlation for major deep inhomogeneities makes it possible to plan a method for separating gravitating objects situated at different depths. [210]

V. UPPER ATMOSPHERE AND SPACE RESEARCH

News

LUNAR SOIL SAMPLES TO BE STUDIED BY INDIAN SCIENTISTS

Moscow PRAVDA in Russian 4 Mar 77 p 4

[TASS Report: "Lunar Soil for Indian Scientists"]

[Text] On 3 March in Moscow lunar soil samples brought back to earth by the Soviet automatic station "Luna-24" were handed over to representatives from the Indian National Academy of Sciences.

The director of the USSR Academy of Sciences Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Corresponding Member of the Academy of Sciences V. L. Barsukov presented the capsule to Doctor N. Bandari.

The presented samples will be studied at India's research institutes.
[5]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-896"

Moscow PRAVDA in Russian 4 Mar 77 p 1

[TASS Report: "'Kosmos-896'"]

[Abstract] The artificial earth satellite "Kosmos-896" was launched in the Soviet Union on 3 March 1977. The satellite was inserted into an orbit with the following parameters:
    -- initial period, 88.5 minutes;
    -- apogee, 216 kilometers;
    -- perigee, 194 kilometers;
    -- orbital inclination, 72.9 degrees.

TASS ANNOUNCES "SALYUT-5" COMPLETES 4,050 REVOLUTIONS

Moscow PRAVDA in Russian 2 March 77 p 2

[TASS Report: "'Salyut-5': Flight Continues"]

[Text] Flight Control Center, 1 March. The research station "Salyut-5", which was launched into near-earth orbit on 22 June 1976, after completion of the work of the cosmonauts Viktor Gorbatko and Yuriy Glazkov, is continuing its flight in an automatic control mode.

By 1500 hours Moscow time on 1 March the "Salyut-5" station completed 4,050 revolutions around the earth. At the present time the station's orbital parameters are:
   -- apogee, 272 kilometers;
   -- perigee, 249 kilometers;
   -- orbital inclination, 51.6 degrees;
   -- period of revolution, 89.5 minutes.

According to the data of telemetry information all on-board systems of the station are functioning normally and the assigned temperature and pressure are being maintained in its compartments.

During the flight scientific and technical experiments and tests of the station's on-board systems are being continued in different operational modes. In accordance with the planned program, on 26 February the return vehicle containing materials of the studies and experiments separated from the station. At the calculated time its retrorockets were fired and the parachute system was activated. The return vehicle landed in an assigned area of the Soviet Union.

Materials for research and experiments, which were delivered to earth, are being processed and studied.

The flight of the "Salyut-5" station continues. [5]

"SOYUZ-24" COSMONAUTS TRAVEL TO ZVEZDNYY

Moscow PRAVDA in Russian 6 Mar 77 p 2

[Article by A. Pokrovskiy: "Zvezdnyy Meets..."]

[Excerpt] Exactly at the designated hour the plane with the cosmonauts taxied to a stop. V. Gorbatko and Yu. Glazkov approached the chairman of the State Commission and said, "The flight program has been completely fulfilled. We are ready to carry out new tasks of the Party and government."

We had seen just how confidently the "Tereki" had worked in distant space. Telecommunication sessions let us see for ourselves how the cosmonauts performed various scientific and technical experiments in orbit and how at home they felt on the "Salyut-5" station. Their first conversations on earth with specialists and doctors confirmed the fact that they had completed the broad program of operations and that their state of health was excellent.

V. Gorbatko and Yu. Glazkov were embraced and congratulated on their return to Moscow by relatives, close friends, by the training instructors of Soviet cosmonauts, and by the designers of Soviet rocket and space technology.

The first meeting was short and then they were off to Zvezdnyy after leaving the airport. On their return from space, the Soviet cosmonauts placed the first flowers at the base of the monument to Yu. A. Gagarin. Then, in accordance with tradition, a meeting was held at Zvezdnyy which was dedicated to yet another successful flight in space. The participants in the meeting received a salutatory letter from the Central Committe of the CPSU, the Presidium of the USSR Supreme Soviet, and from the USSR Council of Ministers.

Immediately after the meeting the State Commission at its own meeting noted the successful work of the cosmonauts. Then Gorbatko and Glazkov briefly talked to journalists about their flight. They especially emphasized that the welcoming telegram from Comrade L. I. Brezhnev which they received on the "Salyut-5" station gave them new strength. [5]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-897"

Moscow PRAVDA in Russian 11 March 77 p 3

[TASS Report: "'Kosmos-897' in Flight"]

[Text] The artificial earth satellite "Kosmos-897" was launched in the Soviet Union on 10 March 1977. The satellite carries scientific equipment intended for the continuation of space research. The satellite was inserted into an orbit with the following parameters:
    -- initial period, 89.7 minutes;
    -- apogee, 371 kilometers;
    -- perigee, 182 kilometers;
    -- orbital inclination, 72.9 degrees.

In addition to the scientific equipment the satellite carries a radio system for the precise measurement of orbital elements and a radiotelemetry system for transmitting data on the operation of instruments and scientific equipment to earth.

The apparatus installed on the satellite is functioning normally. The coordination-computation center is processing the incoming information. [5]

FILM MADE ON "SOYUZ-22" MISSION

Moscow PRAVDA in Russian 11 Mar 77 p 6

[Article by V. Gubarev: "Chronicle of a Flight"]

[Text] Vladimir Aksenov was the first to look out of the ship.

"Taiga!," he shouted to the commander. "It won't be easy to find us."

"It will be difficult for the helicopter pilots to notice us," said Bykovskiy. "We'll have to prepare ourselves for a long wait..."

Soon a bonfire crackled cheerfully while the cosmonauts took out their reserve supplies, and prepared supper. At that time a helicopter with a search party hovered over them...

This episode in the training of the "Soyuz-22" crew is from the new film "Earth -- a Close-Up" which was reviewed at the Presidium of the USSR Academy of Sciences. Cinematographers of the studio "Tsentrnauchfil'm" began to film the preparation for the space experiment performed jointly by specialists from the USSR and GDR long before the launch of the "Soyuz-22." The 30-minute film contains the three years preceding the launch of the ship which was piloted by V. Bykovskiy and V. Aksenov and their eight-day flight in September 1976.

The authors of the film (director D. Antonov, script writer V. Kuzin, and the cameraman V. Afanas'yev) have shown how the MKF-6 camera was developed in the institutes of the USSR and GDR, how the workers of the national enterprise Carl Zeiss Jena constructed it, and how it has passed conclusive tests at Baykonur. The story about the crew's preparation for flight runs the same way.

Both cosmonauts turned out to be excellent cameramen. The pictures taken in space show a surprising amount of ingenuity. The film "Earth -- a Close-Up" displays the huge role which is assigned to pictures of our planet in cosmonautics. An investigation of the earth's resources from space is being successfully developed by scientists from socialist countries and this film convincingly confirms this. [5]

TASS ANNOUNCES "SOYUZ-24" COSMONAUTS PRESENT FIRST WORK REPORT

Moscow PRAVDA in Russian 3 Mar 77 p 2

[TASS Report: "'Salyut-5': First Report"]

[Text] Baykonur, 2 March. Specialists on various systems of the spaceship and orbital station gathered in the cosmodrome to hear the crew report how their work went aboard the orbital laboratory. Engineers briefed the cosmonauts on the details of yet another operation performed according to plan on the second expedition aboard the "Salyut-5." On 26 February the return vehicle dropped to earth after separating from the station, which was transferred to operation in automatic mode by the cosmonauts. This package sent from the orbital station contains materials of the scientific studies and experiments performed during the expedition.

The return vehicle dropped to earth is essentially a "mini-baggage ship" which has its own retrorockets and parachute system like those of the descent capsule of the "Soyuz." On command from earth, it separated from the station and dropped down in a designated area.

Viktor Gorbatko and Yuriy Glazkov thanked the engineers and presented their first work report. The cosmonauts had with them log books and notebooks containing entries made in space. Tape recorders were turned on and the conference began. The work notebooks of the engineers, who are specialists in the systems of the ship and station, contain pertinent notations and suggestions of the cosmonauts.

"Each meeting of this kind, which is held immediately after a mission," said Major General A. A. Leonov, commenting on the results of the first working conference of cosmonauts and specialists, "helps us to introduce corrections into the organization of the scientific research process on orbital stations and to construct the best chart of the cosmonauts' work and rest."

According to Leonov, the main impression one gets from the first report of the cosmonauts is that the crew was completely satisfied with the station's design and the possibilities of using the station to perform various scientific and engineering experiments. At this time the unmanned station is continuing to study the earth. Now after eight months of the successful operation of yet another research laboratory in orbit, one thing is clear -- the "Salyut" stations are being transformed from experimental research posts into permanently operational laboratories of world science. In addition, cosmonautics is becoming an official branch of the national economy. [5]

PREPARATIONS OF RECOVERY TEAMS IN "SOYUZ-24" LANDING AREA

[Article by V. Vorob'yev: "The Earth Awaits You, Cosmonauts!"]

[Summary] The new spaceship was launched only a few days ago. But people are already here at the site of the impending return to earth. The rescue teams are on hand to meet and evacuate the cosmonauts. These teams are outfitted with helicopters and special cross-country vehicles. The intended landing region has been repeatedly surveyed. A study has been made of all danger zones: highlands, lakes, forested patches; specialists have ascertained the depth of the snow cover and ascertained whether the ice on the lakes is strong. In short, a detailed reconnaissance was made. The search teams have undergone rigorous training exercises in preparation for this event. For example, parachutists were landed at nighttime, amidst a blizzard. Upon receiving a test signal, the search-rescue service had to depart as speedily as possible. Some places unsuited for helicopter landings would have to be reached by half-track, or possibly air sledges or amphibian vehicles. Doctors will be on the scene at once to examine the cosmonauts and hot drinks and warm clothing will be instantly available. Flier-cosmonauts Aleksey Leonov and Nikolay Rukavishnikov are here to welcome their colleagues back to earth. On the morning of 24 February the wind attained a storm force. A blizzard blew over the steppe. The snow was blowing and burned the face. But preparations went on... Little time remains before the landing. The rescue teams are ready...
[317]

Abstracts of Scientific Articles

STUDY OF WIND CONDITIONS IN UPPER ATMOSPHERE BY SATELLITE

[Article by Aniko Paal, Central Institute of Atmospheric Physics, Budapest]

[Abstract] Wind conditions in the upper atmosphere can be studied on the basis of the King-Hele theory (D. G. King-Hele: "Theory of Satellite Orbits in an Atmosphere," Butterworths, London, 1964) using the effects of the upper atmosphere on orbital inclination. The resultant effect of the wind in the upper atmosphere is characterized by the upper atmosphere angular velocity, which expresses the number of revolutions per day of the vector connecting the air particle at a given altitude and the center of the earth. This may be calculated on the basis of the King-Hele theory. The effects on seven satellites were calculated by this method between 1968 and 1970. A computer was used in the project. The variations in the orbital inclinations were not related to gravitational effects from the moon, the sun, the earth or other bodies, but they were related to upper-atmosphere winds and storm events. There appears to be a correlation between ionospheric storms and upper-atmosphere wind velocity and between atmospheric density and ionospheric storms. In an Appendix (pp 353-355) the King-Hele theory is illustrated by examples.
[342]

THERMAL EMISSION OF RANDOMLY INHOMOGENEOUS STRATIFIED MEDIA

[Article by V. L. Brekhovskikh and V. I. Tatarskiy, Institute of Physics of the Atmosphere, "Thermal Emission of Randomly Inhomogeneous Stratified Media"]

[Abstract] The thermal radioemission of stratified structures, such as Antarctic ice, has some peculiarities associated with multiple reflections on inhomogeneities. In this paper the authors examine and compute the coefficients of reflection of electromagnetic waves from a slightly absorbing stratified randomly inhomogeneous medium for horizontal and vertical polarization of the radiation. In the computations the authors used the method of equations for the distribution of probabilities of the reflection coefficient. It was possible to obtain the angular dependences for the brightness temperature of emission for both polarizations. The results of the computations are compared with experimental data obtained using the artificial earth satellites "Kosmos-243" and "Kosmos-384."
[351]

DESCRIPTION OF THOMAS PRECESSION

[Abstract of article by Yu. I. Morozov; Moscow, OPISANIYE PRETSESSII TOMASA NA OSNOVE NEINERTSIAL'NOY SOPUSTVUYUSHCHEY SISTEMY OTCHETA S VRASHCHENIYEM (Description of Thomas Precession on the Basis of a Noninertial Accompanying Reference System with Rotation), Institute of Applied Mathematics USSR Academy of Sciences, Preprint No 126, 1975, 20 pages]

[Text] The article gives a general determination of a noninertial accompanying reference system which is then made more specific for the case of rotation in a centrally symmetric metric system. On the basis of this determination it was possible to describe Thomas precession and to clarify the physical sense of the operational procedures required for its understanding.
[290]

AERODYNAMIC CHARACTERISTICS OF ARTIFICIAL EARTH SATELLITES

[Abstract of article by V. V. Grudnistyy, V. F. Kameko, V. N. Chepurnoy, Yu. T. Reznichenko and E. P. Yaskevich; --, KOSMICH. ISSLED. NA UKRAINE. RESP. MEZHVED. SB., No 8, 1976, pp 14-24, "Determination of the Aerodynamic Characteristics of Artificial Earth Satellites of a Complex Configuration with Allowance for Screening"]

[Text] The article describes a combined experimental-theoretical method
for determining the aerodynamic characteristics of artificial earth sat-
ellites of a complex configuration with screening taken into account. The
method involves modeling of an oncoming free-molecular flow of gas by a
parallel flux of light in which is situated the model of an artificial
earth satellite, measurement of the coordinates of the contour of the
shadow on the surface of the model and obtaining the total aerodynamic
characteristic by means of integration for the illuminated surface of
the components of the aerodynamic force acting on a unit surface area. The
authors give a description of the apparatus for modeling the flow and meas-
ing the coordinates of points on the contour of the shadow on the surface
of a model of an artificial earth satellite. The article gives expressions,
convenient for programming on an electronic computer, for the aerodynamic
forces and moments acting on the "illuminated" sectors of standard surfaces:
plate, circular cylinder, circular cone and sphere. Also given are recom-
mendations on the use of this method in different fields of space technol-
ogy. Bibliography of seven items.
[290]

EFFECT OF SOLAR ACTIVITY ON IONOSPHERIC PHOTOELECTRONS

[Article by I. A. Krinberg, L. A. Akatova and L. A. Garifullina, "Influence
of Solar Activity on Fluxes of Photoelectrons in the Earth's Ionosphere and
Plasmosphere"]

[Abstract] It is shown that photoelectron fluxes measured at different al-
titudes with different illuminations of the ionosphere by the sun and dif-
ferent levels of solar activity, after their reduction to standard condi-
tions, give good agreement with one another and with theoretical computa-
tions for $F_{10.7} = 144$. An analysis of the fluxes computed and measured for
different solar activity levels makes it possible to conclude that the
semi-empirical estimates of the intensity of solar ultraviolet radiation
made by Ivanov-Kholodnyy and Firsov for low activity quite truly reflect
the real picture and for high activity are too low.
[345]

SATELLITE MEASUREMENT OF PERMANENT ELECTRIC FIELD

[Article by V. F. Agarkov, N. M. Antonov, O. L. Vaysberg, V. I. Zhurchev,
S. I. Klimov, V. Ye. Korepanov, V. D. Maslov, L. V. Pesotskiy, I. V. Rozh-
ankovskiy, V. M. Sinitsyn and V. K. Shakhov, "Measurement of the Vector of

Strength of the Permanent Electric Field on the 'Kosmos-484' Satellite.
I. Problems in the Method and Results of Measurements in the Middle Lati-
tudes"]

[Abstract] The article describes a method for making measurements of the
three components of the vector of strength of the permanent electric field
using a system of double probes and the method of transmitting data through
telemetric channels ensuring a relative error in measuring signals of 10^{-1}.
On the basis of the results of measurements (Λ = 20-45°) in the middle lat-
itudes the authors estimate the contributions from: an induced electric
field, floating potential of the probes, output of electrons from the sur-
face of the probes, potential distribution in the zone of flow around the
probes and the drag of the plasma surrounding the probe.
[345]

DETERMINING REQUIRED FUEL SUPPLY FOR SPACECRAFT CARRIER

[Abstract of article by L. T. Gripp and V. A. Dolodarenko; --, KOSMICH.
ISSLED. NA UKRAINE. RESP. MEZHVED. SB., No 8, 1976, pp 88-91, "One Case
of Determining the Required Supplies of Fuel of a Spacecraft Carrier"]

[Text] The article gives an approximate method for determining the requir-
ed fuel reserves for a standardized carrier designed for putting a large
series of spacecraft into different orbits. The difference in orbits is
that for putting spacecraft into them under nominal planning conditions
it is necessary to attain different values of the control functionals
by firing of the engine. The correctness of selection of the fuel reserves
is confirmed by the results of modeling of the putting of a great number
of carriers into orbits. The method can be used in developing standardiz-
ed carriers for which many problems are solved with fuel expenditures not
exhausting the total fuel reserve.
[290]

MODULATION OF ELECTRON FLUX AND GEOMAGNETIC PULSATIONS

[Article by A. V. Gul'yel'mi, P. V. Vakulov, B. Dobrovol'ska, N. M. Bondar-
enko and S. Fisher, "Modulation of the Flux of Electrons with an Energy
> 40 keV on the Basis of Data from the Artificial Earth Satellite 'Inter-
kosmos-5' and Geomagnetic Pulsations"]

[Abstract] On the basis of data from the "Interkosmos-5" artificial earth satellite and the network of ground observatories a study was made of the correlation between modulation of the flux of electrons (E > 40 keV) and geomagnetic pulsations. It is possible to distinguish two principal types of modulations -- diffused and injected. It was possible to determine the characteristic parameters of each type of modulation. It is concluded that there is an exponential dependence of the depth of diffusional modulation on the amplitude of geomagnetic pulsations. It is shown that the injection type of modulation has a temporal nature and this arises with the "pulsed" injection of hot plasma from the tail of the magnetosphere. In some cases the period of modulation of electrons is close to double the period of magnetic pulsations; this is probably evidence of the presence of a parametric effect. There was found to be a quasi-periodic modulation of the electron flux not accompanied by magnetic oscillations of systems with a variable number of particles.
[345]

INTERPRETATION CRITERIA FOR SNOW COVER

[Abstract of article by Yu. V. Kurilova and L. K. Poplavskaya; Moscow, PRIROD. VODY I OKRUZHAYUSHCHAYA SREDA, 1976, pp 16-19, "Criteria for Interpreting the Snow Cover"]

[Text] For analysis of melting of the snow cover on the basis of television images of the "Meteor" satellite the authors proposed two relative interpretation criteria -- brightness contrasts and image texture. These criteria were selected because of their great information content, stability and possibility of application to images having a tone wedge. On the basis of data from a great number of examined frames for snow-covered surfaces for basins of the Volga, Don, Ob' and other rivers it was possible to establish the following typical textures for underlying surfaces covered by snow: dull, grainy, dendritic and spotty. The difference in the pattern of typical textures is determined for the most part by landscape factors. Thus, an analysis of snow melting on the basis of the texture of key sectors (including high-mountain sectors) indicates a close dependence of snow distribution and its melting on relief. This makes it possible to judge the thickness of the snow cover when the local relief is known and to use the "coloring" of the snow to study the basin surface, so important for a study of the structure of runoff. Photo tone contrasts are other stable interpretation criteria. Contrasts at the snowy-snowless surface border are so great that they make it possible to plot a clear snow cover boundary on all frames.
[276]

ASTROMEASUREMENTS FOR DETERMINING SATELLITE ORBITS

[Article by B. Ts. Bakhshiyan and A. A. Sukhanov, "Selection of Optimum Makeup of Astromeasurements for Determining Orbits of Artificial Satellites"]

[Abstract] A study was made of the problem of optimum choice of the moments of observations and navigational stars when using astromeasurements. The results obtained in earlier studies are used in solving the problem of optimization when there is a great number of visible stars. The authors examine a general method for solving the problem with different hypotheses concerning the correlation dependence between the measurement errors, essentially involving a modification of the simplex algorithm for solving the problem of linear or quadratic programming. It was possible to suggest changes in the simplex method for solving the formulated problem when using measurements of the altitude of a star above the planet's horizon and measurements of the time when a star sinks below the horizon or appears from beneath the horizon. It is shown that the information content of these two types of measurements coincides when natural assumptions are made concerning measurement errors. The article gives the results of computations for a lunar satellite with use of measurements made from the earth.
[345]

ACCURACY IN DETERMINING ANGULAR POSITION OF UNORIENTED SATELLITES

[Article by A. M. Titov and V. P. Shchukin, "Influence of Correlated Measurement Errors on the Accuracy in Determining the Angular Position of Unoriented Artificial Earth Satellites"]

[Abstract] In evaluating the parameters of dynamic systems on the basis of the results of measurements it is common to use the least squares method, based on the assumption of a nondependence of measurement errors. In practical computations this assumption is not always justified and therefore the problem arises of investigating the influence of correlated measurement errors on the accuracy in determining parameters. In this paper this problem is solved for evaluating the accuracy in determining the orientation of artificial earthquakes when the measured functions used are the direction cosines of the vector of strength of the geomagnetic field and the sun. It is assumed that the satellite rotates about a main central axis of inertia; satellite motion is considered Eulerian. The measurement errors are stationary random series. Spectral and correlation methods for the analysis of time series are used for investigating the statistical properties of the error in determining orientation. The paper gives data for evaluating

the accuracy in determining orientation for one- and two-vector measurement systems and selecting the optimum discreteness interval for measurements. [345]

CHARACTERISTICS OF GLIDING BODY FOR DESCENT ONTO MARTIAN SURFACE

[Article by N. M. Ivanov, A. P. Martynov and N. M. Sokolov, "Choice of the Principal Planning-Ballistic Characteristics and a Method for the Control of Spacecraft of the Gliding Type Designed for Descent onto the Martian Surface"]

[Abstract] A study was made of the problem of selecting the planning-ballistic characteristics of spacecraft of the gliding type for making a descent on the Martian surface. Emphasis is on the problem of maximizing the loads on the frontal surface of the spacecraft. The authors examine three methods for control of a spacecraft: using the banking angle, angle of attack and joint change in the banking angle and the angle of attack. The effectiveness of each of the methods was evaluated using the minimum final velocity which can be attained with optimum control at the end of the segment of aerodynamic braking. The presented numerical results make it possible to draw qualitative conclusions concerning the desirability of using any particular type of spacecraft in dependence on the load on the frontal surface and accordingly, selecting an effective control method.
[345]

SATELLITE MEASUREMENTS OF LARGE-SCALE ELECTRON CONCENTRATION INHOMOGENEITIES

[Article by G. P. Komrakov, E. Ye. Mityakova and V. V. Pisareva, "Results of Measurements of Large-Scale Electron Concentration Inhomogeneities Using the 'Kosmos-381' Satellite Under Magnetically Quiet and Disturbed Conditions"]

[Abstract] The paper gives the results of processing data on inhomogeneities of electron concentration at an altitude of 1,000 km by the high-frequency probe method and also data on fluctuations of the total electron concentration N_n obtained during the ground reception of signals from the "Kosmos-381" artificial satellite by the dispersion method. It was found that the appearance of inhomogeneities measuring $l \lesssim 50$ km has a diurnal variation with a maximum at nighttime and a minimum at daytime. For larger inhomogeneities the diurnal dependence of the appearance of inhomogeneities is poorly expressed. The relative values of the fluctuations of electron concentration $(\Delta N/N)$ exhibit a dependence on geomagnetic latitude. For inhomogeneities

observed using a probe, smaller in size $l \sim$ 50 km, this dependence $\overline{(\Delta N/N)}$
on geomagnetic latitude is clearly expressed with a minimum at the geomag-
netic equator and an increase toward the polar latitudes on both magnetic-
ally quiet and on magnetically disturbed days. For large l this dependence
on latitude has a nature similar to that indicated above only on magnetic-
ally disturbed days. Under magnetically quiet conditions the equatorial
minimum is displaced to latitudes $\sim$30°N. It is possible that such a shift
is caused by seasonal asymmetry. For inhomogeneities measured by the inte-
gral method the nature of the dependence is such that there is an equator-
ial minimum which is displaced northward by about 10°. With an increase in
magnetic activity the $\overline{(\Delta N/N)}$ value increases for all types of inhomogen-
eities.
[345]

LOW-ENERGY PROTONS NEAR OUTER BOUNDARY OF RADIATION BELTS

[Article by A. S. Kovtyukh, M. I. Panasyuk and E. N. Sosnovets, "Comparison
of Fluxes of Low-Energy Protons with Critical Levels Near the Outer Boun-
dary of the Earth's Radiation Belts"]

[Abstract] The authors make a joint analysis of the differential fluxes and
rigidities of proton spectra in the energy region from 31 to 377 keV meas-
ured aboard the "Molniya-1" artificial earth satellite during the period
23 January - 23 April 1974. The "Molniya-1" was launched into a high ellip-
tical orbit with an apogee of about 40,000 km in the northern hemisphere
and a perigee of about 500 km in the southern hemisphere. The period of
revolution was about 12 hours and orbital inclination was about 65°. The
proton fluxes were measured using a differential spectrometer with a semi-
conductor detector. For L = 5, 6 and 7 the article gives data on the dif-
ferential fluxes and mean energies E_0 of the proton spectra from the inter-
vals 31-92, 67-122 and 182-377 keV under quiet conditions and during weak
magnetic activity ($K_p \leqslant 3^-$). It is shown that in the region $L \geqslant 6$ the observ-
ed fluxes of protons with energies of tens of keV are close to the critical
levels for ion-cyclotron instability.
[345]

OBSERVATIONS OF TYPE-II SOLAR BURSTS

[Article by V. P. Grigor'yeva, "Observations of Type-II Solar Bursts in the
Low-Frequency Radio Range"]

[Abstract] This paper gives the results of observations of bursts of solar radioemission, type II, from the "Prognoz" and "Prognoz-2" satellites in the frequency range 70-750 KHz obtained using a four-range detector with a loop antenna. An estimate is given for the mean velocity of shock wave propagation for each case of observations in May and in August 1972 for two models of the distribution of electron concentration in the solar corona. It follows from the presented analysis of plasma measurements and radio observations of type-II bursts in the low-frequency radio range aboard the satellites and surface radio observations in the meter and decameter ranges that the shock wave in the corona at a distance up to $10R_\odot$ has a lesser velocity than at distances from 10 to $100R_\odot$, where its velocity can be considered constant. The estimate of velocity at distances up to $10R_\odot$ is based on a joint comparison of the time of appearance of the burst in the meter and decameter ranges and also with the time of appearance of the burst in the kilometer range. On the basis of radio observations in the kilometer range it is possible to estimate the velocity of shock wave propagation in the corona at a distance from 10 to $100R_\odot$. Slowing of the shock wave was obtained from a comparison of radio data from the "Prognoz" with plasma measurements on the "Pioneer-9" and "Pioneer-10." The shock wave moves on the average with a variable concentration and with conservation of the energy flux is first accelerated (with $R < 3.5R_\odot$) and then tends to a constant velocity. Allowance for dissipation can give a further slowing of the wave. [345]

MEASUREMENT OF ATMOSPHERIC GLOW OUTSIDE REGION OF ARTIFICIAL AURORA

[Article by S. B. Lyakhov and G. G. Managadze, "Measurement of Atmospheric Glow Outside the Main Region of an Artificial Aurora"]

[Abstract] The article cited above gives the results of photometric observations in experiment "Feyerverk" with the injection of electrons at L = 2. It was possible to register the increase in glow of the night sky outside the region of injection of an electron beam into the atmosphere. [The "Feyerverk" experiment was an important stage in preparations for the Soviet-French "ARAKS" project] This report shows that the experimental conditions, characteristics of the injected electron beam and plasma flux from aboard the rocket and the presence of a highly sensitive photometer with a high selectivity, oriented in the necessary direction, created real conditions for the generation and detection of the so-called triggering effect, that is, the stimulated leakage of electrons trapped in the radiation belts. The temporal characteristics of the injection processes registered by the rocket and on the ground have a high correlation coefficient. The flux of electrons trapped in the tube of force $(L \sim 2)$ is considerably greater than the flux of electrons which during leakage generated a glow of this intensity.

It can be concluded that in this experiment it was possible to observe a triggering effect generated by joint exposure to a beam of high-energy electrons and a flux of cold plasma.
[345]

SOLAR RADIATION REFLECTED BY OCEAN-ATMOSPHERE SYSTEM

[Article by M. S. Malkevich, L. G. Istomina and W. Hovis, Institute of Atmospheric Physics and Goddard Spaceflight Center, "Spectral Structure of the Field of Solar Radiation Reflected by the Ocean-Atmosphere System"]

[Abstract] In an earlier paper by the authors (IZV. AN SSSR, FAO, 13, No 1, 1977) it was demonstrated that for remote sensing of the ocean from satellites it is necessary to develop methods for taking into account the solar radiation reflected by the ocean surface since the latter can increase by an order of magnitude the absolute values and change the spectral composition of ocean brightness. It was found that there is a relatively poor correlation between variations of atmospheric brightness in the spectral regions $0.4-0.5\mu$m and $0.55-0.70\mu$m (the correlation coefficients at the 10-km level do not exceed 0.3-0.4), although the correlation between the corresponding coefficients of attenuation (for the surface layer of the atmosphere) or optical thicknesses (for the entire column of the atmosphere) on the basis of ground measurements is closer. A possible reason for the decrease in correlation between brightness in different parts of the spectrum is that variations of the scattering coefficient or optical thickness lead to brightness variations whose sign is dependent on which of the two effects -- attenuation or multiple scattering -- predominates in the particular spectral region. The collected data make it possible to define two approaches to allowance for the atmosphere in problems of determining ocean parameters on the basis of measurements of the spectral brightness of the ocean-atmosphere system, based on use of the statistical characteristics of the spectral structure of the brightness field or the statistical characteristics of the spectral structure of the optical thickness of the atmosphere.
[351]

OBSERVATIONS OF SATELLITES USING AUTOMATIC CODE INSTRUMENT

[Article by Stanislaw Oszczak]

[Abstract] In order to increase the number of observations of artificial earth satellites, their accuracy and automatic reading and processing, the Station for Observation of Artificial Earth Satellites No 1151 at Olsztyn has developed a set of devices for the automatic recording of observation results. It consists of: a TZK-based instrument (theodolite) with automatic recording of circle read-out; an electronic chronograph, which tape-perforates indications of the crystal clock at observation times; a radio receiver with an electronic attachment, to establish contact between the clock time base and the radio time signal. Due to these devices, the pressing of a button by the observer at the time of transit of the satellite through the middle of the instrument cross-hairs causes the recording on a punched tape of the read-outs of the horizontal and vertical circles and their observation time. The observer also compares, before and after observation, the indications of the crystal clock with the radio time signals and records them on the teleprinter. The punched tape with the observation results is processed by computer. The code instrument was installed at the beginning of 1975 at the Observation Station No 1151 at Olsztyn. The instrument was constructed in the Electronics Laboratory of the Geodesy Department of the Agricultural-Technical Academy at Olsztyn. The author discusses the method and techniques used in determining the systematic instrument errors. The mean error of a single observation is on the order of 1'.
[136]

VI. MISCELLANEOUS

News

POLAND ESTABLISHES ANTARCTIC STATION ON KING GEORGE ISLAND

Moscow PRAVDA in Russian 8 Mar 77 p 5

[Text] An expedition from the Polish People's Republic Academy of Sciences
has disembarked on the shore of King George Island. Here they will estab-
lish the first Polish permanent research station in the Antarctic. [5]

"SEVER-29" EXPEDITION BEGINS ARCTIC RESEARCH

Moscow IZVESTIYA in Russian 10 Mar 77 p 2

[TASS Report: "According to the 'Polex' Program"]

[Text] Yakutsk. With the coming of spring in the Arctic a new stage of in-
vestigations in the "Polar Experiment" program has started. Five polar avia-
tion planes carrying research workers of the high-latitude air expedition
"Sever-29" left the settlement of Cherskiy for the region of the New Siber-
ian Islands where they have started oceanographic filming of the Arctic
Ocean basin.

The researchers, who are located in different areas of the ocean, will
observe ice drifts and meteorological conditions in the territory which ex-
tends from the coast of the Laptev and East Siberian Seas to the North Pole.
Data from these investigations are necessary for the composition of long-
range models of weather and climate in the vast area of the Soviet Union.
[5]

SEASONAL FIELD OPERATIONS COMPLETED AT "DRUZHNAYA" STATION

Moscow PRAVDA in Russian 3 Mar 77 p 6

[Article by V. Bardin: "Make Way, Icebergs!"]

[Summary] The seasonal field work of the Soviet Antarctic Expedition at "Druzhnaya" station has been completed. The flag of the USSR has been hauled down and the GDR flag has been raised. [An East German specialist was at the station in all stages of its operation.] Work has been completed on the loading of the diesel-electric "Penzhina" -- it is carrying away rolls of aerial film, readings of the geophysical instruments and geological collections. Also loaded aboard are the AN-2 aircraft and MI-8 helicopters. Almost all the personnel of "Druzhnaya" station are already aboard the ship (except for the crews of two IL-14 aircraft which have flown off to "Molodeshnaya"). The work program has been completely implemented. Geological-physical and topographic-geodetic field work have covered extensive regions of the mountains and glaciers of Antarctica. An aerial photographic survey was carried out in an area of about 70,000 square kilometers. An airborne magnetometer survey covered an area many times greater: 300,000 square kilometers. Recently the "flying geophysical observatory" carried out a number of interesting radial flights over distances of more than a thousand kilometers. Two of these flights were run into the depths of the continent: to the Pensacola Mountains and the South Pole. On the intracontinental flight lines data were obtained on the thickness of Antarctic glaciers, near the pole attaining 2,800 m. Interesting magnetic anomalies were discovered. At a distance of 500 km from "Druzhnaya" the "Penzhina" will rendezvous with the steamer "Estoniya." As shown by an aerial reconnaissance, the ice conditions favor the approach of the "Estoniya" to the shores of Antarctica. Most of the personnel of the "Druzhnaya" station will transfer to this passenger vessel.
[338]

5303
CSO: 1866

-END-